# Knee-jerk Anti-LOOPism and other E-mail Phenomena: Oral, Written, and Electronic Patterns in Computer-Mediated Communication

by
JoAnne Yates
Wanda J. Orlikowski

WP #3578-93 June 1993

# Knee-jerk Anti-LQOPism and other E-mail Phenomena:
## Oral, Written, and Electronic Patterns in Computer-Mediated Communication

**JoAnne Yates**
Sloan School of Management
Massachusetts Institute of Technology
50 Memorial Drive (E52-545)
Cambridge, MA 02139
(617) 253-7157
jyates@sloan.mit.edu

**Wanda J. Orlikowski**
Sloan School of Management
Massachusetts Institute of Technology
50 Memorial Drive (E53-329)
Cambridge, MA 02139
(617) 253-0443
wanda@eagle.mit.edu

June 1993

To be presented at the *53rd Annual Meeting of the Academy of Management,*
Atlanta, GA: August 1993.

**ACKNOWLEDGMENTS**

The authors would like to thank Miriam Oh for her dedicated research assistance, and Craig Murphy for his generous advice. Thanks are also due to the Common LISP members who participated in our study, to Jim Hollan who helped us locate the Common LISP archive, and to Kent Pitman who provided helpful comments on an earlier version of this paper. The research support of the Center for Coordination Science at the Massachusetts Institute of Technology is gratefully acknowledged. Both authors contributed equally to this paper.

# Knee-jerk Anti-LOOPism and other E-mail Phenomena:
## Oral, Written, and Electronic Patterns in Computer-Mediated Communication


### Abstract

This paper reports on an empirical investigation into the on-going electronic interaction of a natural distributed group. Prior organizational research into use of electronic media has focused primarily on usage patterns and only occasionally on a few linguistic features, while linguistics researchers have looked more closely at certain technical aspects of language use in electronic communication. Interested in a broader range of linguistic and textual features that might be exhibited in the electronic mail medium, we conducted an exploratory study of the electronic communication of a task-oriented group over a 27-month period. Using qualitative and quantitative techniques, we found that the electronic mail messages displayed features normally associated with both speech and written discourse, as well as features that seem new to the electronic medium. The use of all three patterns was influenced by characteristics of the medium, the group, and its task.

## INTRODUCTION

Since the introduction of electronic mail into organizations, there has been much interest in the communication and organizational changes that use of such a medium would occasion (Culnan and Markus, 1987; Fulk and Steinfield, 1990). This interest has generated many studies of the effects of electronic mail on communication in organizations (Eveland and Bikson, 1988; Feldman, 1987; Finholt and Sproull, 1990; Mackay, 1988; Markus, 1987; Rice 1984; Rice and Love, 1987; Sproull and Kiesler, 1986). While most of these have focused on usage patterns, some have also examined actual messages generated in various settings.

Despite this interest in electronic mail, the organizational literature has paid surprisingly little attention to the language and textual features of electronic communication. A few researchers have investigated socio-emotional content (Rice and Love, 1987; Hiltz and Turoff, 1978) and uninhibited language or "flaming" in electronic mail (Siegel, Dubrovsky, Kiesler, and McGuire, 1986; Sproull and Kiesler, 1986); more recently, we have looked at linguistic formality in electronic mail interaction as one element of genre (Orlikowski and Yates, 1993). Still, other aspects of language usage (e.g., humor, discourse style, punctuation, etc.) have rarely been examined by organizational researchers studying communication media.

Researchers rooted in linguistics and technical communication have more closely examined some features of language usage in electronic media. Some of these researchers (Murray, 1985, 1988; Ferrara, Brunner, and Whittemore, 1991) have suggested that computer-mediated communication, particularly on-line, synchronous communication, challenges the generally assumed (though increasingly questioned--Biber, 1988) dichotomy between written and oral language. Ferrara, Brunner, and Whittemore (1991) assert that the interactive written discourse generated in a laboratory setting represents an emergent register or variety of language that demonstrates linguistic characteristics usually associated with both written language (e.g., formal language, complex sentences, evidence of editing) and oral language (e.g., omission of unstressed pronouns and articles). Murray (1985:206), studying synchronous electronic communication in a real organization, also argues that "Computer conversation draws from

features of both written and oral discourse." She focuses on two dichotomies that have been attributed to written versus oral language: detachment versus personal involvement and integration versus fragmentation. Wilkins (1991), in studying computer conferencing of novice users previously unacquainted with each other, noted their use of graphics to represent oral language features. She suggests that this pattern contributed to the building of interpersonal relations among the users.

We were interested in investigating linguistic and textual patterns in the asynchronous electronic communication of a natural group whose members were collaborating on a task over an extended period of time. We felt that these patterns should reveal something about the group's social interaction and their use of the electronic medium. We were interested in a broader range of language patterns than have been studied to date in the organizational literature, and found the linguistics research on electronic communication as it related to written and oral language intriguing. Because of our social rather than linguistic orientation, we chose not to adopt any one of the linguistics frameworks discussed above. Rather, we elected to do an inductive study, drawing on previous media, genre, and linguistic research only as it related to our data itself.

We conducted an exploratory study of on-going electronic interaction over a considerable period of time to capture a full range of communication phenomena. In particular, we examined the electronic transcripts of a distributed group of participants who, in a 27-month period, communicated primarily via electronic mail to define a standard for the LISP computer language.[1] We found that the electronic mail interaction of this group displayed features normally associated with both speech and written discourse; however, our study revealed dimensions of oral and written discourse that differ from those of prior linguistic research, being rooted primarily in social, task, and medium characteristics. Further, we also found aspects of language use that appear to have emerged within the electronic medium itself.

[1] This study is part of a larger project that investigated other aspects of this group's use of electronic communication (see Orlikowski and Yates, 1993 for more details).

The following section describes the research methods that we followed to conduct our study. We then discuss the findings in terms of the three patterns of language use evident in our data, providing illustrations and explanations for each. We conclude by suggesting some implications of this exploratory work.

## RESEARCH METHODS

The group we studied consisted of computer language designers who, during the 1970s, had worked with and developed various dialects of the artificial intelligence language LISP. In 1981, they were pressured by their funding agencies to come up with a standard LISP language to ensure compatibility across different computers. Over the next three years, these language designers worked on producing such a standard, which came to be known as the Common LISP (CL) language. Located at research laboratories distributed throughout the U.S., these designers conducted almost all their deliberations and negotiations via electronic mail transmitted among sites on the ARPANET computer network. Electronic mail was an obvious choice for this group: travel was expensive, time was scarce, and they were all regular users of electronic mail already.

While a few hundred participants regularly read the messages, most did not actively participate in the design process. Seventeen frequent participants, generally key LISP designers with major responsibilities for LISP implementations, formed the core of the group. Because the LISP designer community was relatively small, all of the major participants knew each other personally from conferences or from having worked together. The 1353 messages generated by this core group, which were archived at one of the sites, constituted the primary data for our study.

We analyzed the message transcripts both qualitatively and quantitatively. First, we read large portions of the archive to become familiar with its contents, and to see how the participants were using electronic mail in their project. This textual analysis provided the basis for devising a coding scheme and for interpreting the subsequent quantitative results. The coding categories, developed for investigating the evolution of genres of organizational communication (Yates and

Orlikowski, 1992), covered three aspects of messages -- purpose, structure, and language (see Orlikowski and Yates (1993) for more details on the coding scheme). Only a subset of linguistic and structural indicators are relevant for this study (see Table 1).

Insert Table 1 about here

The messages were coded by a research assistant. To judge coder reliability, one of the researchers independently coded a stratified sample of messages selected to represent all coding categories. Intercoder reliabilities were extremely high (Cohen's kappa of 0.80 or above) for all the categories used in this study (see Table 1).

Background information and perspectives for interpreting the messages came from a series of face-to-face, two-phase, semi-structured interviews we conducted with nine of the major participants in the CL project. The interviews were conducted after preliminary content analysis of the messages had been completed, allowing us to draw on the results of this analysis during our interviews. The first phase of the interview questioned the participants about project history, group membership, roles, and social norms. The second phase, a variant of the discourse-based interview (Odell, Goswami, and Herrington, 1983) and customized to each participant, elicited comments on the initial patterns observed in the message archive. These interviews grounded our interpretation of the messages and helped to confirm, elaborate, and explain the patterns we detected.

## RESULTS AND DISCUSSION

Our qualitative and quantitative analysis of the messages revealed evidence of attributes typically associated with both written and oral discourse. In addition, we found some new textual features that seemed to be occasioned by the electronic medium. Our results and discussion are organized around these three patterns.

## Oral Patterns

In an interview, one CL participant characterized the group's electronic mail interaction in part as follows:

> One thinks of having a conversation. It feels like interaction--like speech--interactive and informal.

Indeed, the language, syntax, and punctuation of the CL messages suggested informal conversation as well as the oral interaction characteristic of meetings.

The informality of much of the word choice and syntax makes it seem closer to casual speech than to paper-based genres such as the memo or report. In the coding, we used as the criterion for formality "language that would be acceptable in a typical organizational memo or report." On this basis, informality was quite prevalent in our sample, with 66.4% of all messages being coded as informal. Informality evidenced itself both in word choice and in syntax. For example, the following excerpt from a message reveals informality of word choice:

> By the time users learn to really groove on this lexical stuff and use it a lot, we'll probably have your portable super-compiler running for Vax, or maybe someone else's.

The words "groove" and "stuff" are clearly informal and would more typically be used in speech than in memos or reports. Likewise, the choice of "crock" in the following message extract suggests the informality of the CL interaction:

> I've always thought that &allow-other-keys was a crock, and that unrecognized keywords should just be quietly ignored.

Syntactic informality often took the form of incomplete sentences and conversational cadences. For example, the phrase ending this message extract is not a complete sentence:

> While I am on this theme, I withdraw my earlier suggestion that we flush &allow-other-keywords. Temporary insanity, the result of over-work.

Incomplete sentences were particularly common in messages that reproduced and then responded to embedded pieces of previous messages. For example, in responding to embedded messages, participants replied with phrases such as these:

> Yes.
>
> Certainly. That's why I sent in my previous message
>
> That's right; the manual ought to address this point.

Such embedded messages relieved the writer of the task of paraphrasing previous comments or summarizing previous arguments in responding to them, thus allowing syntactically incomplete responses that could have been spoken immediately after the original comment, simulating the give and take of conversation. Embedded messages were present in 21.7% of the CL messages, though the responses to them did not always exhibit this conversational quality. Syntax could also be combined with word choice and punctuation (an inherently written characteristic) to simulate oral communication, as in the following quotation:

> Hmm, I see. . . while REMAINDER[2] and MOD are different in general, they agree on what is zero.

The informal, conversational rhythm created by the "Hmm" and the ellipsis is clearly intended to evoke (although through written means) spoken discourse. Similarly, "Sigh" and "Gasp" were used occasionally to mimic vocalizations or paralinguistic features (cf. Wilkins, 1991). For example, in response to a proposal by a participant, another responded:

> Sigh! Well, I suppose we could call these things GENERAL-CHAR-1-D-ARRAYS, but that's pretty awful.

Another device used to mimic characteristics of speech is the textual indication of emphasis on words or phrases (present in 15.2% of the messages). For example, participants often used capital letters to create the sense of oral emphasis: "If an implementation DOES support vectors ..." Alternatively, they used pairs of hyphens or asterisks to indicate emphasis, as in: " . . . since in most implementations it can't be -quite- the same as . . ." and: "I'm not sure that you really do have *two* choices . . . ." Such emphasis might be indicated in written text using underlining or italics, options not yet supported by most protocols for exchanging electronic mail, but formal written style tends to shun such highlighting except in the case of key terms. In some cases, exclamation points added this oral emphasis, as in a subject line "No No! Flush it!!" All of these devices depend on the alphanumeric characters of written text, but they are used to evoke the emphasis of speech.

---

[2] Unless otherwise indicated, terms in all capital letters are LISP language terms.

Some linguistic and structural aspects of the electronic interaction evoke oral interactions more typical of the meeting genre (Yates and Orlikowski, 1992) than of casual conversation. While all of the messages in the CL archive were sent to the entire group, 2.5% of these messages included comments addressed to a named individual. For example, in a message responding to a proposal by one individual, a participant observed:

> Not everybody on the mailing list seems to agree with your set here. I do, by the way, but clearly Rick does not. I hope the official referee will figure out what to do about this. Guy?

In his comment to Guy (the project's informal coordinator), the originator of the message was, in effect, turning to Guy and inviting his participation in the interaction. In another message, a participant summarized the debate on two issues, then turned the floor over to another participant by asking:

> Scott, shall we have an auxiliary mini-ballot on these two things?

Both these cases resemble a common occurrence in meetings: someone holding the floor turns it over to another person or solicits input from that person on a relevant point.

In other situations, comments to individuals do not specifically invite their participation; rather they simply pass on information. For example, a message covering several topics included the following side comment to a specified individual:

> Guy, Jane has figured out some good ways to do this in Scribe.

Likewise, some asides within messages apologized to or thanked a named participant, as in this comment appearing mid-way in a long message:

> Scott, I apologize for not reading your proposal carefully enough. It does indeed answer all my questions.

Such comments clearly resemble those that occur in a face-to-face meeting, when a speaker turns towards and briefly addresses one of the individuals present, but without yielding the floor to that person.

The comments to named individuals just discussed were sent to all participants, and hence were public utterances within the group's interaction. In addition to the public discussion, our interviews revealed the existence of some private, back-channel electronic communication between two or more individuals that was not sent to the group as a whole. Such messages, like

whispered side conversations in a meeting, involved concerns or strategies adopted by allies on particular issues. Thus the language of the CL messages demonstrated several characteristics more typical of oral communication in an organizational setting--casual conversation or organized meetings.

**Written Patterns**

While the patterns evident above would suggest that the CL messages were informal, spontaneous, and conversational, our findings also reveal characteristics more typical of written documents. Perhaps the most obvious difference between synchronous oral discourse and many types of written discourse is the ability to reflect on, edit, and shape the message before sending it, a characteristic abundantly evident in the CL messages. In interviews, several of the participants commented on the care they took in composing their messages and arguments:

> When I compose an e-mail message, I generally re-read it before sending it. Being able to edit messages is an important part of e-mail systems.
>
> E-mail is a precision tool. I use it very deliberately. ... E-mail is very different to other media, for example, there is an archive. So I take great care with the messages I send.
>
> E-mail is more convenient than face-to-face as you don't have to respond right then, you can contemplate, and respond at your own convenience.

The messages themselves, in both language and syntax, often show evidence of careful composition into written text. One participant told us that he "hand-crafted" his messages. Another participant discussed his technique for editing his messages to save his readers' time:

> I expend more effort to decide how to make things easier for my reader. I became very mindful of this during the Common LISP project. If I spent one extra minute to save a reader one minute, that was a saving of 200 to 1.

While careful composition does not preclude informal language, and the absence of informal language does not guarantee it, we might expect that more formal language would correlate with more careful composing or editing of messages. Thus, it is worth noting the absence of informal language in 33.6% of the messages. Some of these more formal messages contain suggested wording for the CL manual itself. For example, the following passage is from a note with the subject line "revised BREAK writeup":

> Compatibility note: Maclisp's BREAK takes two optional arguments. The first would be a string if Maclisp had strings. The second is a boolean value specifying whether BREAK should break or return immediately. In Common Lisp one makes a BREAK conditional by putting it inside a conditional form such as WHEN or UNLESS.

As we would expect from the subject line's signal that the message is intended to be taken as part of a written (and ultimately paper-based) document, the language here is characteristic of formal written documents such as manuals. In another case, a participant prefaces a message by saying,

> Guy and Scott, here is a rambling essay on closures and why I don't think we should say anything about EQLness of closures in this edition: ...

In this opening, the writer compares his message to a genre of written discourse, the essay. Although the structure of the message as a whole is not so clear as in the manual example, its language is clearly well thought out and edited, as this extract shows:

> Consider 'trivial' closures---for instance, ones that appear in LABELS, and are simply used to define functions and run them. A better characterization is that they are closures that are never returned as values, are never (really) created repeatedly in loops, and which never are passed as arguments to non-lexically-apparent functions. For these I'd like to CONS them once - at load time. Guy's example on page 75 of the Laser edition is good, but even if the functions in the LABELS were to close over some variables, these closures can be created once at load-time, and their bindings could be updated on each entry to the appropriate LAMBDA.

Another indication of a written pattern of discourse in many messages is the use of formatting devices and related language primarily or exclusively used in writing. Subheadings, a textual organizing device which does not have a direct analogue in speech, appear in 4.7% of the messages. For example, one message attempting to lay out some design alternatives the group needed to consider had the following series of subheads after its introduction:

> TRANSITIVE VS. INTRANSITIVE "INHERITANCE"
>
> "COPY" VS. "POINTER" SEMANTICS FOR IMPORTED SYMBOLS
>
> PACKAGES AS A UNIT OF LOADING
>
> PACKAGES AS A UNIT OF COMPILATION

These subheads, as well as the care shown in the development of each section, are characteristic of written genres of communication such as the report or memo. Another, somewhat less formal, message used the following subheads to highlight the writer's reactions to a previous proposal by another participant:

- Negative comments first:

- Negative comments not really related to the issue at hand:

- Minor positive comments:

- To get down to the point:

While these subheads are less formal than the first set, they still use visual formatting to organize text in a way not possible in conversation.

Similarly, 13.2% of the messages have lists. While brief oral lists are possible through enumeration, they are much less common than in writing. Often, as in the following passage, lists in these messages seem to indicate the careful shaping of material more common in written than in oral communication:

> . . . I have three reasons for preferring the DO form:
>
> 1. A lingering feeling the MAP forms are flaky and are generally to be avoided, probably left over from the days in which the binding issues were not worked out. So this is not terribly rational, but it's still a pretty strong aversion with me.
>
> 2. A lingering feeling that MAP forms are inherently less efficient, since they require an extra function call. Of course, a sufficiently wily compiler could eliminate this call, but I bet that the inefficiency will be showing up in a lot of implementations for some time to come.
>
> 3. Perhaps strongest: the observation that we have gone to DO-SYMBOL, etc., and that we should try to use the same style everywhere. (I hope that this will not lead to the counter-proposal that we should go to MAP-forms everywhere, but I probably hope in vain.)

Here, in spite of the informality of words and phrases such as "flaky" and "I bet," the passage is constructed in a way that would be unlikely to occur orally. Moreover, the line leading into the list includes a forward reference to the three points that follow, a feature linguists call *cataphora* and consider more characteristic of written than of oral language (Ferrara, Brunner, and Whittemore, 1991).

Interviews highlighted another feature of written text available in electronic mail and relied on by the CL participants: a record of the interaction. Electronic mail provided, as one participant noted, "a transcript at no effort." The message transcripts were, as we have indicated above, archived electronically and accessible to all interested parties in electronic or printed form. This feature was critical to the participants. In fact, one noted that in contrast to electronic mail, the telephone

> ...was not a useful medium [for the CL project] because it has no record and we needed an archive.

In the introduction to the manual produced by the CL project, the manual coordinator noted that the archive "proved invaluable in the preparation of this manual" (Steele, 1984: xi). Another participant explained more generally:

> To document is very important to me. So often, I have sent e-mail next door just to get a record.

One of the participants we interviewed, quoting another group member, provided an eloquent testimonial to both the close relationship of recording to written communication and the importance of the record to the group:

> The best memory does not pale ink equal.

Thus electronic mail can preserve the documentary value salient in much organizational writing (e.g., reports, memos, letters), a capability the CL group valued highly.

## Electronic Patterns

Most interesting of the patterns we observed in the CL messages are some that are apparently entirely new to electronic media, though in many cases they would have been technically possible in other (usually written) media. In some cases, the participants used the visual representation of writing to achieve the spontaneity and humor more characteristic of speech. For example, the graphic of a sideways smiley face ":-)" was used to indicate that something was to be taken as a joke. According to The New Hacker's Dictionary (Raymond, 1991) and to our interviews, one of the key participants in the CL group had introduced this device a year or two earlier on an electronic bulletin board system. It was used only rarely in this group (appearing in fact, in only 9 messages or 0.67% of the total), and was still new enough to require explanation for some participants. When a participant had reacted to an exchange of humorous proposals as if they were serious, another participant sent a message explaining:

> Perhaps I shouldn't have been so deadpan; I thought surely everyone would recognize Skef's proposal as a joke. (The last line of his message contained the glyph :-) which is a not-yet-widely known joke indicator (it's a smiling face).)

Other similar types of graphic humor also appear in the messages. For example, when one participant's proposal received extensive comments (many critical) from other participants, the proposer responded with the following message:

> Gasp! . . . . . .
>
> .
>
> .
>
> Thud!

A form of graphic humor depending on backwards writing is exhibited in a message apologizing for transposing the user initials of two participants:

> The PARSE-INTEGER proposal was submitted by Bernie (BSG), not by Glenn (GSB), though Glenn sent a message endorsing the proposal. My apologies to Bernie and Glenn for the confusion.
>
> .lanimret ym htiw gnorw gnihtemos ro aixelsyd eb tsuM
>
> ttocS --

All of these instances of graphic devices for humor were created with standard alphanumeric characters, and thus could have been used in typed documents. The sideways smiley face was never so used, as far as is known. The second example is similar to devices used in certain types of twentieth century poetry (e.g., that of e.e. cummings), but is now being used in work-related communication. The backwards writing might appear in children's' literature but is highly unlikely in paper-based organizational communication. These graphic devices, like the graphic displays noted by Wilkins (1991), take advantage of the visual nature of electronic communication combined with the informality and humor of oral interaction.

Another form of humor that appears in these electronic messages--one based on typographical errors--also depends on the visual nature of text but does not create images in the same way that graphical devices do. For example, in one case a transposition of "obvious" into "obviosu" drew a comment from another participant. The originator of the error then responded with the following message, under the subject line "Obviosu effect":

> The Obviosu effect is the electromagnetic dual of the Hall effect. It causes memory to be scrambled when you type on your keyboard, for example. So if you try to delete a hash-table entry currently given to the maphash function, it obviosuly clobbers your LISP.
>
> --Quux

A similar example occurred when, in response to a misspelling of "appalled" as "apalled" by one participant, another began his message,

> Well, as long as we're being apalled (or even appalled, for those of you who are into traditional spelling) ..."

Another participant picked up on this in a message with a subject line "Apalled," punning on various computer terms:

> A marvelous word, this. Perhaps Kent meant that Common LISP is in danger of being "APPLEd", that is, forced into the Procrustean bed of an APPLE's memory size. This danger can be avoided by making the language so large that it cannot possiblt [sic] be shoehorned into an APPLE. However, I think this is already the case without RESTART being added.
>
> Or perhaps Common LISP is being "APL'd", but better to blame that on REDUCE and MAP than on RESTART.
>
> But most likely is that he simply wished to "applaud" the RESTART form.
>
> (Sorry, Kent, don't mean to tease, but it's wonderful how this typo landed splat between four or five applicable words.)
>
> --Quux

This use of typographical errors as the basis for humor, does not, to our knowledge, appear in paper-based organizational communication, which is typically produced by skilled intermediaries such as secretaries.

These two examples also demonstrate a discourse feature that would not be likely to appear in either written or oral organizational communication, although it has appeared in CB and ham radio communication. The originator of these two messages, who normally signed off with his first name, used his alter ego "Quux" for these humorous messages. In our interview with him, he indicated that "I use the moniker Quux, or the Great Quux as an explicit deadpan indicator that this is not to be taken seriously." Others indicated that this individual was known in the broader computer community for using the Quux persona when doing creative work outside the Common LISP project as well as within it. Since no one else in the group had such a well-known alter ego, the fact that no one else in the group used this technique is probably not surprising.

Another textual pattern that seems new to electronic communication is what we might term subject line humor. Most of the messages (93.3%) have a subject line, characteristic of written memos, to allow the identification and retrieval of strands of the debate. In general, subject lines were straightforward identifiers of topics; however, occasionally the subject lines played an additional role. For example, after announcing a deadline at midnight on a certain day, the coordinator of the group then issued a message indicating that the deadline had arrived. This message, sent at one minute past midnight, had the following subject line:

> BONG BONG BONG BONG BONG BONG BONG BONG BONG BONG BONG BONG

mimicking a clock striking twelve. In a follow-up message, the coordinator corrected a typographical error in the message itself, adding the comment:

> I was typing so fast I blew it, and still didn't get the message out until 00:01. Sigh.

In this case, the timing of the message (also recorded in the header) combined with the onomatopoeia of the subject line to create humor of a sort that would not be likely to appear in any written memo.

In other cases, subject line humor depended on the evolution of the subject line from message to message in the same conversation. Typically, a series of messages on a single topic just repeated the original subject line. Yet, because the exchanges were rapid and conversational in feel, participants sometimes played on these subject lines as part of the discussion. For example, one series of messages had subject lines progressing as follows:

> Here is a good idea, I think
>
> Here is a bad idea, I think.
>
> Here is a terrible idea, I think
>
> A bunch of lousy ideas
>
> Here is a tired Quux, I think

Thus, participants are integrating the informal spontaneity of oral discourse with the more traditional static nature of the subject line in written memos.

Interestingly, the phenomenon of flaming attributed to electronic communication by previous researchers (Siegel, Dubrovsky, Kiesler, and McGuire, 1986; Sproull and Kiesler, 1986)

is less evident in the task-oriented CL group than might be predicted on the basis of this previous research. While 23.8% of the messages were coded as emphatic, most of them were simply strong statements of agreement or disagreement with the substance of another participant's position or argument (e.g., "I strongly disagree" or "That's definitely wrong.") rather than the emotional outbursts, name-calling, exaggerated emphasis, inappropriate innuendoes or sarcasm, and obscene language of flaming. In interviews, CL participants cited two primary reasons for the relatively low level of flaming. First, as one participant said,

> Most of the people knew each other and had met before we started. So there wasn't much flaming. Dealing with faceless people promotes flaming and depersonalizing. Peer pressure prompts people to tone down their messages. We had pressure to write things in a less provocative tone.

Another participant noted that their personal relationships with each other contributed to the use of emphatic but not inflammatory language:

> You had to watch your language as this crowd was used to having intelligent arguments. It was strongly rhetorical. We could do this because we knew each other and respected each other so we were used to this style of conversation. People probably flamed less here than in other groups.

Second, the task itself, a complex and highly controversial negotiation, created an incentive towards restraint. Two participants commented:

> The subject matter was important and it [the Common LISP mailing list] had a wide distribution. This wasn't idle chatter but we were trying to get the job done. So you didn't want to disrupt the process, and you didn't want to discredit yourself.

> There was a reason to be polite. We had a job to do.

These two factors--familiarity with other participants and task demands--kept flaming at a relatively low level. In fact, one participant explained to us his strategy for avoiding flaming:

> I would sometimes write a message, wait an hour and then take out some of my sarcasm before sending it off. . . . But we couldn't have done it on the phone, say. I just wouldn't have been able to hide my sarcasm in that medium.

Occasionally, however, spontaneous outbursts of frustration did appear. As one participant said "We each had times when we ran out of control." For example, the issue of whether to retain the LOOP operator in Common LISP generated extensive debate. Eventually one participant, in an apparently spontaneous outburst, sent a message with the comment:

> I am sick to death of knee-jerk anti-LOOPism and I am beginning to irrationally regard it as a plot to disable me as a programmer by excommunicating my useful tools.

This outburst was not allowed to pass without comment, however. Another participant stepped in at this point, with what he later described to us as a "voice of reason," rebuking the spontaneous outburst and smoothing the waters:

> it seems to me that expressions like "knee-jerk anti-LOOPist" are highly unprofessional and have no place in this discussion. they only serve to divide people into two camps and do very little good. ... please, resist the urge to do name-calling. with the general level of passion individuals have on particular issues, we just can't afford to lose track of that we're working together, not against each other.

In a few cases, flames took a humorous tone. After a controversy about the LISP function MEMBER, one critic said:

> Don't take me too seriously. Remember that my comment was simply on the general grounds that we should stick as close to Lisp 1.5 as possible. There is no reason to pay any more attention to my opinion on this issue than in the 1587 other places where incompatibilities have been introduced over my protests. Frankly, I am inclined to agree with the LISPM users who responded, "after completing redesigning the language, why is everybody so upset about MEMBER?" Reminds me of straining out gnats while swallowing camels. Personally I don't want to swallow either gnats or camels, and you can expect to hear protests from me as a matter of principle whenever you deviate from Lisp 1.5. But Common Lisp seems to be committed to swallowing 2 camels, 3 hippopotami, and assorted small alligators. (It is my opinion that at this point the dreaded stacus spaghetticus dwimus could enter and no one would even notice.)

This passage is clearly less spontaneous than the "knee-jerk anti-LOOPist" remark. Moreover it tempers the flaming with humor. Another way in which individuals attempted to control the impact of their flaming was by identifying and bracketing such passages (e.g., beginning with "#+FLAME-MODE 'l" and ending with "l"), before continuing in a more reasonable tone.

The visual and linguistic playfulness of the electronic messages and their occasional lack of inhibition both differ markedly from the oral and written forms of discourse commonly found in organizational settings. The electronic medium seems to have provided an opportunity for the evolution of new language and textual patterns.

## CONCLUSION

In this paper we have investigated the linguistic and textual patterns of electronic communication in an ongoing group of participants collaborating on a specific task. Similarly to Murray (1985, 1988) and Ferrara, Brunner, and Whittemore (1991) in their studies of synchronous computer-mediated communication, we found characteristics typical of both oral

and written discourse in the asynchronous electronic mail of an on-going, task-oriented group. However, we did not limit ourselves to the linguistics frameworks adopted by these researchers, but looked at a range of linguistic and textual features that were present in the messages and that evoked oral and written discourse. On the one hand, the messages reflected the interactivity and spontaneity characteristic of oral discourse. Specifically, we found that the syntax and word choice often evoked conversational informality, emphasis, rhythm, and even vocalizations. On the other hand, the messages evinced characteristics of written discourse such as formal wording, careful composing and editing, and textual formatting. More interestingly, we also found evidence of patterns that seem more distinctively characteristic of electronic interaction. The messages displayed graphic, typographical, and subject line humor, patterns unlikely in written and oral discourse in organizations.

All of the observed patterns reflect both the capabilities of the medium and the characteristics of the group. The interactivity characteristic of oral discourse is supported and encouraged by the ability to engage in rapid exchanges and to respond to embedded excerpts of previous messages. At the same time the asynchronous nature of the medium and the editing capabilities of the participants' electronic mail systems allowed reflection and crafting more characteristic of written discourse. Finally, the medium's ability to support informal textual exchanges unmediated by secretaries (who would be more likely to correct the typographical errors and insist on serious subject lines) allowed participants to develop a playful relationship with the text or, on occasion, to indulge in flaming.

The characteristics of the group as a social unit and of its task also shaped the patterns of discourse observed in the messages. The informal and conversational style of the interaction in part reflected the fact that core participants in the project knew each other personally and professionally. The careful crafting and subsequent archiving of the messages noted as characteristic of written communication were influenced by the complex, important, and long-term nature of the group's task. The playfulness with which the group took advantage of new electronic capabilities evinces the participants' previous experience with electronic mail and with

their social community, as well as their knowledge about computers in general. Flaming, noted in other contexts as characteristic of electronic interaction, is limited in this set of messages by the familiarity of the group members and the seriousness of their task.

Our investigation of this body of electronic messages has distinguished characteristics of both written and spoken discourse as well as characteristics seemingly unique to electronic discourse. This neat distinction is, however, only analytic; a given message might reflect one, two, or all three of these patterns. Nevertheless, this distinction illustrates the versatility of discourse styles occurring in electronic communication, a versatility not yet fully explored in organizational research into electronic media. Our study also demonstrates that the context of interaction (including characteristics of the individual users, their social community, and their task demands) influences the particular combination of linguistic and textual characteristics that will be expressed. These findings, while limited to a single setting, suggest the richness and complexity of human communication via new electronic media and argue for more detailed, extensive, and contextual research in this area.

## REFERENCES


Biber, D. 1988. Variation across Speech and Writing. Cambridge: Cambridge University Press.

Culnan, M.J. and Markus, M. L. 1987. Information Technologies. In Jablin, F.M. Putnam, L.L, Roberts, K.H. and Porter, L.W. (Eds.), Handbook of Organizational Communication: An Interdisciplinary Perspective: 420-443. Newbury Park, CA: Sage.

Eveland, J.D. and Bikson, T.K. 1986. Evolving Electronic Communication Networks: An Empirical Assessment. Proceedings of the Conference on Computer Supported Cooperative Work. Austin TX: 91-101.

Feldman, M. S. 1987. Electronic Mail and Weak Ties in Organizations. Office: Technology and People. 3: 83-101.

Ferrara, K., Brunner, H., and Whittemore, G. 1990. Interactive Written Discourse as an Emergent Register. Written Communication, 8: 8-34.

Finholt, T. and Sproull, L. S. 1990. Electronic Groups at Work. Organization Science. 1: 41-64.

Fulk, J. and Steinfield, C.W. (Eds.), Organizations and Communication Technology. Newbury Park, CA: Sage.

Mackay, W. E. 1988. Diversity in the Use of Electronic Mail. ACM Transactions on Office Information Systems. 6: 380-397.

Markus, M. L. 1987. Toward a 'Critical Mass' Theory of Interactive Media. Communication Research. 14: 491-511.

Murray, D. 1985. Composition as Conversation: The Computer Terminal as Medium of Communication. In Odell, L. and Goswami, D. (Eds.), Writing in Nonacademic Settings: 203-228. New York: The Guilford Press.

Orlikowski, W.J. and Yates, J. 1993. From Memo to Dialogue: Enacting Genres of Communication in Electronic Mail. Working paper #3525, Sloan School, MIT, Cambridge, MA.

Raymond, E. 1991. The New Hackers' Dictionary. Cambridge, MA: MIT Press.

Rice, R.E. 1984. Mediated Group Communication. In Rice R.E. and Associates (Eds.), The New Media: Communication, Research, and Technology: 33-54. Newbury Park CA: Sage.

Rice, R.E. and Love, G. 1987. Electronic Emotion: Socioemotional Content in a Computer-Mediated Communication Network. Communication Research. 14: 85-108.

Schmitz, J. and Fulk, J. 1991. Organizational Colleagues, Media Richness, and Electronic Mail. Communication Research. 18: 487-523.

Siegel, J., Dubrovsky, V., Kiesler, S. and McGuire, T.W. 1986. Group Processes in Computer-Mediated Communication. Organizational Behavior and Human Decision Processes 37:157-186.

Sproull, L.S. and Kiesler, S. 1986. Reducing Social Context Cues: Electronic Mail in Organizational Communication. Management Science. 32: 1492-1512.

Steele, G.L. Jr., [with contributions by S.E. Fahlman, R.P. Gabriel, D.A. Moon, and D.L. Weinreb] 1984. Common LISP: The Language Nashua, NH: Digital Press.

Wilkins, H. 1991. Computer Talk: Long-Distance Conversations by Computer. Written Communication 8: 56-78.

Yates, J. and Orlikowski, W.J. 1992. Genres of Organizational Communication: A Structurational Approach to Studying Communication and Media, The Academy of Management Review, 17(2): 299-326.

**Table 1: Definition, Reliability, and Distribution of Coding Categories in Archive**

(N = 1353)

| Coding Categories | Reliability (Cohen's κ) | N | % |
|---|---|---|---|
| **Structural Characteristics:** | | | |
| Comment to an Individual | 0.85 | 34 | 2.5% |
| Embedded Message | 0.96 | 293 | 21.7% |
| Graphical Elements | 1.0 | 13 | 1.0% |
| List | 0.98 | 179 | 13.2% |
| Subheadings | 0.85 | 64 | 4.7% |
| Subject Line | 1.0 | 1262 | 93.3% |
| Word or Phrase Emphasis | 0.94 | 205 | 15.2% |
| **Language Characteristics:** | | | |
| Emphatic | 0.84 | 322 | 23.8% |
| Humorous | 0.80 | 144 | 10.6% |
| Informal | 0.84 | 899 | 66.4% |